

**What is claimed is:**

1        1.    A photomask structure for reducing lens  
2 aberration and pattern displacement, comprising:  
3        a transparent substrate; and  
4        a light-shielding layer, disposed on the transparent  
5        substrate and having an array pattern area and  
6        a plurality of assist patterns, wherein the  
7        distance between the assist pattern and its  
8        upper and lower array patterns is equal and the  
9        length of the assist pattern is equal to the  
10       width of the array pattern.

1        2.    The method as claimed in claim 1, wherein the  
2 transparent substrate is a quartz substrate.

1        3.    The method as claimed in claim 1, wherein the  
2 transparent substrate is a calcium fluoride substrate.

1        4.    The method as claimed in claim 1, wherein the  
2 light-shielding layer is chromium.

1        5.    The method as claimed in claim 1, wherein the  
2 thickness of the light-shielding layer is about  
3 150~200nm.

1        6.    The method as claimed in claim 1, wherein the  
2 width of the assist pattern is about 60~80nm.

1        7.    A method of reducing lens aberration and  
2 pattern displacement, comprising:  
3        providing a substrate with a photoresist layer  
4        thereon;

5 defining the photoresist layer by a photomask,  
6 wherein the photomask has an array pattern area  
7 and a plurality of assist patterns and the  
8 distance between the assist pattern and its  
9 upper and lower array patterns is equal,  
10 further the length of the assist pattern is  
11 equal to the width of the array pattern; and  
12 etching an array trench area in the substrate using  
13 the patterned photoresist layer as a mask.

1 8. The method as claimed in claim 7, wherein the  
2 substrate is a silicon substrate.

1 9. The method as claimed in claim 7, wherein the  
2 width of the assist pattern is about 60~80nm.

1 10. The method as claimed in claim 7, wherein no  
2 additional patterns are formed in the photoresist layer  
3 after the pattern is defined.

1 11. The method as claimed in claim 7, after  
2 etching, reducing the CD bias between array patterns to  
3 40%~60%.

1 12 The method as claimed in claim 7, after  
2 etching, reducing pattern displacement to 40%~80.